UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/957,004	09/19/2001	Kollin Tierling	IMM135	2443

34300	7590	03/08/2005	

PATENT DEPARTMENT (51851)
KILPATRICK STOCKTON LLP
1001 WEST FOURTH STREET
WINSTON-SALEM, NC 27101

EXAMINER
NGUYEN, NAM V

ART UNIT	PAPER NUMBER
2635	

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 October 2004*.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-22* is/are allowed.

6)☒ Claim(s) *23-26* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *19 October 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☐ All b)☐ Some * c)☐ None of:

　　　1.☐ Certified copies of the priority documents have been received.

　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☐ Notice of References Cited (PTO-892)
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *6/23/04*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5)☐ Notice of Informal Patent Application (PTO-152)
6)☐ Other: _____.

DETAILED ACTION

This communication is in response to applicant's response to an Amendment which is filed October 19, 2004.

An amendment to the claims 1, 7, 10, 11, 13-19, 21 and 23-25 has been entered and made of record in the application of Tierling for a "circuit and method for a switch matrix and switch sensing" filed September 19, 2001.

The new set of claims 27-29 are introduced.

Claims 1-29 are pending.

Response to Arguments

The corrected or substitute drawing were received on October 19, 2004. These drawings are accepted.

Applicant's amendment and argument with respect to the pending claims 1-22, filed October 19, 2004, are persuasive. Therefore the examiner has withdrawn the rejections.

Applicant's amendments and argument to the rejected claims are insufficient to distinguish the claimed invention from the cited prior arts or overcome the rejection of said claims under 35 U.S.C § 103(a) as discussed below. Applicant's amendment and argument with

respect to the pending claims 23-26, filed October 19, 2004, have been fully considered but they are not persuasive for at least the following reasons.

On page 22, second paragraph, Applicant's amendments and arguments with respect to the invention in Zimmerman, Houston et al. and Feucht et al. do not teach or suggest that wherein selection of a selected row by a scan line returns a scanned column voltage level from the switch matrix to detect if a switch at an intersection of the selected row and the scanned column of the switch matrix has been selected is not persuasive.

As defined by claim 23, Zimmerman disclose that the microcontroller is in a row-scan state. In the row-scan state, the microcontroller disables all column line interrupts and scans the keypad matrix. The microcontroller waits for a predetermined debounce period such as 20 milliseconds. Once the debounce period is over, the microcontroller scans the keypad matrix again. The microcontroller compares the results of the most recent two keypad scans. If the results of the compared keypad scans are different, the keypad has not finished debouncing, and the microcontroller returns to wait for debounce period. Once the keypad has finished debouncing, the results of the most recent two keypad scans will be identical and the microcontroller determines how many keys were pressed (column 4 lines 27 to 67; see Figures 1 and 5-6). Houston et al. disclose a high speed scanning system and method for scanning a matrix of alarm condition sensing means. The matrix is scanned to determine the conditions of the various alarm sensing means by selecting each vertical element of the matrix in turn and for each vertical element sequentially stepping through each of the horizontal elements before the next vertical element is selected (column 2 lines 19 to 65; see Figure 1).

Furthermore, Feucht et al disclose the switching matrix without pre-resistors but with threshold value switches, the number of rows is very much different from that of columns; there are two rows and n columns, whereby n is larger than 2 (column 2 lines 56 to column 3 line 6; see Figure 1). The operating potential U ground is conveyed over connections zu and us. It is temporarily and selectively applied to a row and column line through contacts 1z and 2z of the row lines and contacts s1 . . . sn of the column lines. In the switching matrix shown in FIG. 1 contacts 1z and s1 are closed, so that the full operating potential has effect on threshold value switch X11 over relay R11 connected in series therewith between row and column lines 1. The threshold value switches and relays connected across the other junctions of row and column lines are only indicated by dots and indices of their designation, but it is to be understood that these elements are present. Thus, for example, the point between row 2 and column 2 is designated by 22 (column 2 lines 56 to column 3 line 6; see Figure 1) in order to avoid unintended switch closure in switching matrices wherein the number of rows is very much different from the number of columns.

Therefore, the invention in Zimmerman, Houston et al. and Feucht et al. do not teach or suggest that wherein selection of a selected row by a scan line returns a scanned column voltage level from the switch matrix to detect if a switch at an intersection of the selected row and the scanned column of the switch matrix has been selected.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 24-26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for

failing to particularly point out and distinctly claim the subject matter which applicant regards as

the invention.

Claim 24 recites the limitation "the circuit" in the claim 24. There is insufficient

antecedent basis for this limitation in the claim.

Examiner believes that claim 24 should depend on claim 23.

Referring to claims 25-26 are rejected as being dependent upon a rejected Claim 24

above.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

Claims 23-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Zimmerman (US# 5,760,714) in view of Houston et al. (US# 3,921,140) and in further view of

Feucht et al. (US# 3,689,889).

Referring to claims 23-26, Zimmerman discloses a circuit for more efficient switch

status sensing, the circuit (100) (i.e. an electronic device) (column 1 line 22 to 47; see Figure 1)

comprising:

A plurality of switches (70) (i.e. a keypad matrix) organized in a row ((15) and column

(10) configuration (column 2 lines 46 to 61; see Figure 1); and

A voltage threshold sensing circuit coupled to the switch matrix by a plurality of scan

lines; and

A processor (99) (i.e. a microcontroller) coupled to the voltage threshold sensing circuit

signal bus, wherein selection of a selected row by a scan line returns a scanned column voltage

level from the switch matrix to detect if a switch at an intersection of the selected row and the

scanned column of the switch matrix has been selected (column 2 line 54 to 66; column 3 lines

33 to 64; see Figures 1-3).

However, Zimmerman did not explicitly disclose a plurality of resistors, each of the

resistors electrically coupled in series with an associated one of the plurality of switches.

In the same field of endeavor of switch scanning matrix, Houston et al. teach that the

current sensing circuit (5) (i.e. a horizontal isolation transistor unit) including a bipolar transistor

(85) (column 2 lines 36 to 64; see Figures 1 and 5) in order to detect the level of the output

voltage when a switch is closed.

One of ordinary skilled in the art recognizes using a transistor in a horizontal isolation

transistor unit to detect voltage of Houston et al. in all the column line interrupts of a sequentially

scans for output signal of Zimmerman because Zimmerman suggests it is desired to provide that

using a rising/falling edge triggered interrupt component in a sensing circuit to determine which

key, if any, was validly pressed (column 2 line 57 to column 3 line 22; see Figures 1-3) and

Houston et al. teach that using a transistor in a horizontal isolation transistor unit to detect the

changing voltage signal level of a switch when the switch is pressed (column 2 lines 19 to 64;

see Figures 1 and 5) in order to have a successful and reliable detecting the level of the output

voltage of each switch. Therefore, it would have been obvious to a person of ordinary skill in the

art at the time of the invention was made to use a transistor in a horizontal isolation transistor

unit to detect voltage of Houston et al. in all the column line interrupts of a sequentially scans for

output signal of Zimmerman with the motivation for doing so would have been to provide a

reliable and valid of sensing a switch status when pressed.

In the same field of endeavor of scanning switch matrix, Feucht et al. disclose a circuit

further including: a plurality of resistors (R11), each of the resistors (R11) electrically coupled in

series with an associated one of the plurality of switches (X11) (column 2 lines 56 to column 3

line 6; column 4 lines 3 to 38; see Figures 1-4) in order to protect against false closure of

threshold value switches.

At the time of the invention, it would have been obvious to a person of ordinary skill in

the art to recognize to use each resistor in series with an associated one of the plurality of

switches of Feucht et al. in keypad switch matrix of Zimmerman in view Houston et al. of

because using a resistor in series with a switch would improve the protection against false

closure of threshold value switches that has been shown to be desirable in the keypad switch

matrix circuit of Zimmerman in view of Houston et al.

Allowable Subject Matter

Claims 1-22 and 27-29 are allowed as evident by applicant's amendment and arguments.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nam V Nguyen whose telephone number is 571-272-3061. The examiner can normally be reached on Mon-Fri, 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Horabik can be reached on 571-272-3068. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9314 for regular communications and 703-872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Nam Nguyen
February 21, 2005

MICHAEL HORABIK
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600